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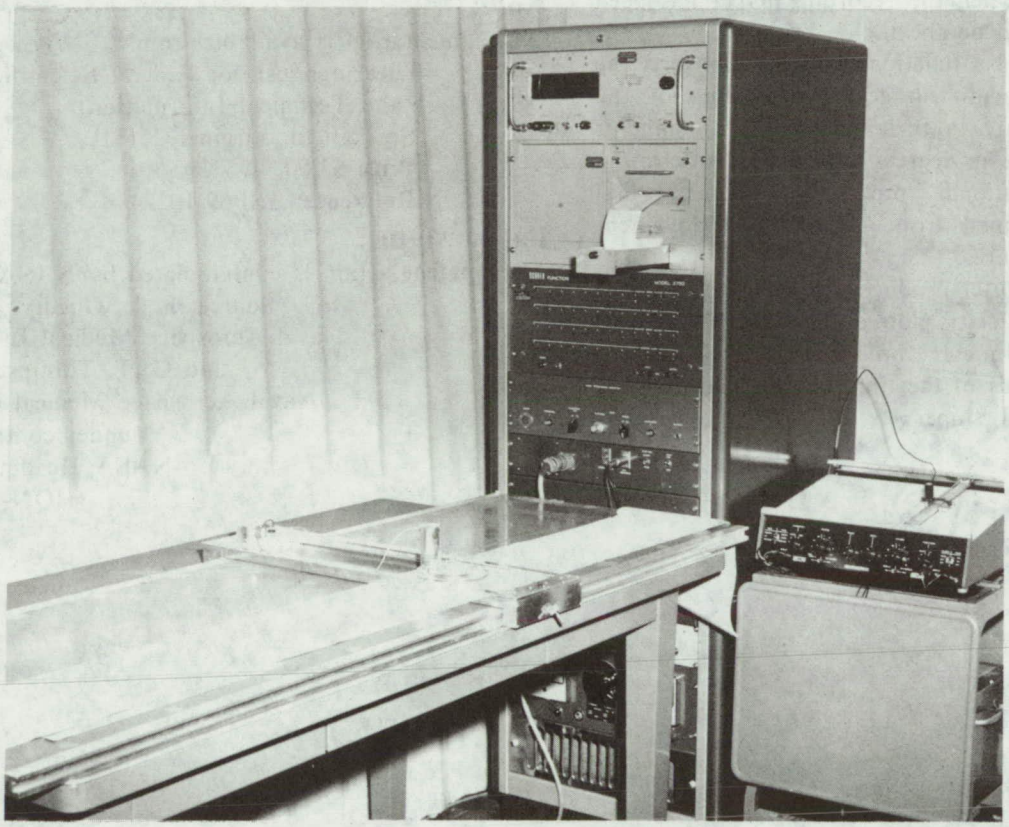
NASA TECH BRIEF

Two Devices for Analysis of Nystagmus



Rapid analysis of nystagmus records should be a substantial aid in the diagnostic evaluation of clinical cases and of aviation personnel disturbed by problems of equilibration, vertigo, and motion sickness.

The problem:

To develop methods and devices to facilitate measurement and analysis of nystagmus records.

The solution:

With recording of vestibular nystagmus by electronystagnography and other methods becoming common practice in clinical and experimental evaluation of the vestibular systems, time consuming manual analysis of the records must be replaced by more rapid analytical methods. Two analytical aids are described.

(continued overleaf)

How it's done:

Electromechanical Slope Computer (ESC). The ESC is a device designed to "read out" the slope and time of each nystagmus wave form. It consists of:

1) A table with a main carriage that moves along the X- or time-axis. A potentiometer attached to the carriage provides voltage, proportional to the lateral displacement, which is the time analog. The carriage allows perpendicular movement of a polished plexiglass assembly along the y-axis. The plexiglass assembly contains a central transparent disc with cross-hairs. Aligning one of the central cross-hairs with a nystagmus slope turns the wiper of a potentiometer which provides a voltage proportional to angular displacement. The tangent of this angle is equal to nystagmus slope when the recording paper has been properly positioned on the table.

2) A variable base function generator converts the angular displacement voltage into tangents of the angle. Tangents are in turn converted into angular velocity of the eyes in degrees per second by setting a dial on the operational amplifier. Appropriate dial settings are obtained from routine eye movement calibration procedures.

3) An X—Y plotter produces the analog display of slow phase eye velocity plotted with respect to time.

4) A digital voltmeter and a digital recorder provide printed records of the time and angular velocity of each measured slope.

With this device records can be scored, tabulated and plotted in about one-tenth the time required for unaided manual completion of the job. The scorer's task is to simply align the cross hair of the central disc with the nystagmus slope. All steps after the cross hair alignment, including tabulation of digital information and plotting of analog information, are accomplished automatically.

Electronic Summation Device (ESD). While not as versatile as the ESC, the ESD provides much faster analysis than the ESC. The device comprises a standard recorder with plug-in units for area summation and timed switching. It provides an immediate analog display and (with a digital voltmeter printer) an immediate digital display of analyzed nystagmus.

Note:

Documentation is available from:

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No patent action is contemplated by NASA.

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